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Comments Supporting Request for Additional Information on Perchloroethylene (PCE); Rulemaking Under TSCA Section 6(a) (Docket ID: EPA-HQ-OPPT-2020-0720)

May 6, 2022

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VIA CDX

Document Control Office (7407M)
Office of Pollution Prevention and Toxics (OPPT)
Environmental Protection Agency (EPA)
1200 Pennsylvania Avenue NW
Washington, DC 20460-0001

Re: Comments Supporting Request for Additional Information on Perchloroethylene (PCE); Rulemaking Under TSCA Section 6(a) (Docket ID: EPA-HQ-OPPT-2020-0720)

To Whom It May Concern:

I write on behalf of The Boeing Company (Boeing) to provide comments on Docket Identification Number EPA-HQ-OPPT-2020-0720 in regard to perchloroethylene (PCE). Boeing is one of the world's largest manufacturers of commercial jetliners and defense, space, and security systems. Boeing products and tailored services include commercial and military aircraft, satellites, weapons, electronic and defense systems, launch systems, advanced information and communications systems, and performance-based logistics and training. Boeing employs more than 100,000 people across the United States, with major manufacturing operations in eight states. As a top exporter, Boeing has customers in more than 150 countries across the world, and supports airlines and U.S. allied government customers in more than 90 countries.

In December 2020, EPA finalized its risk evaluation for PCE and found that it presents an unreasonable risk to workers, occupational non-users, consumers, and bystanders for 59 of 61 conditions of use. As EPA is now required to address these unreasonable risks through risk management actions under TSCA, the Agency requested a meeting with Boeing to inform this activity.

Boeing appreciated the opportunity to meet with the Agency on October 19, 2021 to discuss the aerospace industry's unique and challenging requirements that necessitate the use of PCE. At Boeing, PCE is primarily used as a vapor degreasing solvent, but it is also present in many formulations found within Boeing's manufacturing processes such as in maskants, release agents, cleaners, adhesives, primers, and thinners. As these PCE-containing materials are broadly used within the aerospace industry, it is critical that EPA understand how the development of risk management rules may affect the industry's immediate ability to manufacture and maintain critical aerospace components.

Internal Use of PCE for Vapor Degreasing

Boeing has spent many years, and considerable effort, developing, qualifying, and implementing alternative materials and processes to replace vapor degreasing with aqueous degreasing where technically viable. This transition has successfully occurred for the majority of detail parts (e.g. stringers, spars, seat tracks, brackets, etc.). However, Boeing still manufactures and procures aerospace parts, for both commercial and Department of Defense (DoD) uses, where PCE vapor degreasing is required due to technical challenges with other methods.

The vast majority of complex machining parts and actuation systems parts, which include structural components, gears and other parts that make up drive units and control mechanisms, are cleaned by PCE vapor degreasing at [redacted]. These components must be pre-cleaned to remove organic contaminates to ensure that contamination is not introduced during the manufacturing process. Vapor degreasing is the preferred cleaning method for these components as it does not allow the transfer of contaminates from one part to another. Additionally, while aqueous cleaning is approved for select parts, those that are cleaned in such a manner must be carefully segregated to avoid cross-contamination which substantially increases the required processing time.

Need for an Exemption for Aerospace Uses

As EPA drafts the risk management rules for PCE, Boeing requests the Agency include an adequate transition period for this technically challenging aerospace use as it will require substantial investment and time to develop viable alternatives. Due to the aforementioned concerns with transitioning to aqueous cleaning, Boeing plans to continue to vapor degrease components produced at [redacted]. Identification of a replacement solvent is in work; the core requirements for this alternative are that it must be able to adequately clean, cause no harm to parts, and avoid the potential for regrettable substitutions, i.e. the replacement of PCE with another equally toxic material. For suppliers considering a plan to invest in equipment replacement, conversion from vapor to aqueous degreasing for approved applications is a capital-intensive investment, and likely requires several years to plan, permit, construct and install an aqueous degreasing system after a new system is selected. Additionally, as the aerospace industry transitions from PCE vapor degreasing of aerospace parts, it will need to ensure that DoD and FAA specifications are met and ensure safety of flight. Therefore, Boeing requests that EPA exempt aerospace use of PCE in vapor degreasing for at least 10 years.

Engineering controls associated with PCE Vapor Degreasing

In order to protect workers, Boeing has installed several engineering controls to limit exposure to PCE. Vapor degreasing systems are in well ventilated locations and have solvent vapor detectors nearby to alert employees to any exposure. Each vapor degreaser has secondary containment for spill prevention to prevent discharge to the environment and PCE is transported in overpack containers to prevent accidental spills. Tank chemistry and air emissions are strictly monitored to ensure both fall within limits as required by specification requirements and by the Clean Air Act respectively. Finally,

employees are required to have specialized training in order to operate PCE vapor degreasers.

Monitoring data associated with PCE Vapor Degreasing

As requested by EPA, recent monitoring data associated with PCE vapor degreasing is given below. This data represents PCE vapor degreasing activities utilizing current equipment monitored on Boeing property (Table 1). Please note that all data is well under OSHA's 8-hour TWA exposure limit of 100 ppm.

Table 1: Site monitoring data for PCE Vapor Degreasing

Site / Equipment Type	Additional Information	Personnel or Area	Sample Name	Date	Activity/Location	Sample Time (min.)	Calculated 8-hr TWA (PPM)
[redacted]	typical actuation assembly system operations	P	PII - BEMS ID	6/28/2017	[redacted]	195	0.54
		P	PII - BEMS ID	6/28/2017		197	0.23
		P	PII - BEMS ID	6/28/2017		175	0.015
		A	Area Sample	6/28/2017		470	4.69
[redacted]	distillation unit draining planned maintenance	P	3219719777	3/26/2015		30	3.06
		A	3219719774	3/26/2015		39	0.306
		A	3219719772	3/26/2015		40	0.506

Additional uses of PCE at Boeing

EPA has also requested information pertaining to the use of PCE in applications other than usage in vapor degreasing systems. Boeing uses many materials that contain PCE as an ingredient; Table 2 outlines Boeing specifications that reference the use of PCE-containing materials. Some of these materials have alternatives listed in their respective specifications, but direct replacement cannot be guaranteed without Engineering approval which may require additional testing. For specifications in which there are no alternatives identified, qualification of new materials is required. This can be a time-consuming and costly process; which can take multiple years to complete as it includes qualification testing, certification, and implementation.

Table 3 contains materials that are listed in Boeing's hazardous materials tracking database. This data source does not cover all Boeing-owned sites, but each of the materials listed below are likely to have been present on a Boeing site within the last year. While these materials are not qualified to Boeing specifications, they may be used by facilities and/or maintenance to support production needs or may be connected to R&D activities.

Table 2: Specification Qualified Materials containing PCE (excluding vapor degreasing)

Spec.	Specification Title	Material	Material Use	Alternative?
[redacted]	[redacted]	[redacted]	Adhesive	[redacted]
[redacted]	[redacted]	[redacted]	peelable coating	[redacted]
		[redacted]	peelable maskant	[redacted]
[redacted]	[redacted]	[redacted]	primers for reinforcements	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	solvent	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	release agent	[redacted]
[redacted]	[redacted]	[redacted]	cleaner	[redacted]
[redacted]	[redacted]	[redacted]	release agent	[redacted]
[redacted]	[redacted]	[redacted]	release agent	[redacted]
[redacted]	[redacted]	[redacted]	mold release	[redacted]
[redacted]	[redacted]	[redacted]	ultrasonic cleaner	[redacted]
[redacted]	[redacted]	[redacted]	peelable maskant	[redacted]

Spec.	Specification Title	Material	Material Use	Alternative?
[redacted]	[redacted]	[redacted]	mold release	[redacted]
[redacted]	[redacted]	[redacted]	release agent	[redacted]
[redacted]	[redacted]	[redacted]	release agent	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	primer	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]

Spec.	Specification Title	Material	Material Use	Alternative?
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant	[redacted]
[redacted]	[redacted]	[redacted]	maskant thinner	[redacted]
[redacted]	[redacted]	[redacted]	flux thinner	[redacted]

Table 3: PCE-containing materials present in Boeing's hazardous materials tracking database

Material	Use
[redacted]	adhesive
[redacted]	adhesive/sealant
[redacted]	brake parts cleaner
[redacted]	cleaner/degreaser
[redacted]	electrical parts cleaner
[redacted]	grease
[redacted]	heavy duty degreaser
[redacted]	laboratory material
[redacted]	lubricant
[redacted]	moisture displacer
[redacted]	penetrant/lubricant
[redacted]	penetrating oil
[redacted]	solvent
[redacted]	specialty coating for protection
[redacted]	specialized maskant

PCE Use for Vapor Degreasing in the Supply Chain

While Boeing has transitioned away from vapor degreasing wherever possible, the extent to which Boeing's supply chain has converted to aqueous cleaning is unknown. In many cases, chlorinated solvents such as PCE and TCE are required for vapor degreasing to obtain necessary levels of cleanliness of certain supplied parts by long-standing design specifications that are incorporated into contracts of a complex supply chain. In some cases, there are qualified alternatives to PCE and TCE, and, as long as suppliers meet all requirements listed in the specification, they have the freedom to use any material qualified per the specification (and are not required to inform Boeing of their process). Boeing is unlikely to know which solvents a supplier has selected for vapor degreasing, and what factors were considered when selecting cleaning systems (e.g., technical feasibility, cleaning performance, etc.). Additionally, material declarations and/or auditing processes to validate usage would be burdensome especially considering a significant portion of Boeing's supply chain includes small or minority suppliers.

As stated earlier, transitioning to an aqueous cleaning system can be an arduous process. The equipment is expensive and can take up a large amount of floor space. Process flow will likely need to be reconfigured to account for the new cleaning method. All of these attributes may discourage suppliers from transitioning to aqueous cleaning; but as suppliers look to move away from solvent use, Boeing will encourage and support their efforts. In order to facilitate the complex and time-consuming process required to transition to a new cleaning method, Boeing reiterates its request for a 10-year exemption for PCE vapor degreasing of aerospace parts.

Boeing appreciates this opportunity to provide additional input to EPA to inform its development of the risk management rules for PCE. As mentioned in this letter, PCE in vapor degreasing is used for parts that are critical to the safe operation of aerospace products for which there is presently no technically feasible approved alternative. While we continue to invest in developing alternative solutions, the process is lengthy and requires extensive testing before implementation. We respectfully request that as EPA develops the risk management rules it considers that the aerospace industry must continue to meet DoD and FAA specifications and ensure safety of flight. Please do not hesitate to contact me, or Peter Pagano, at (703) 414-6486 should you have any questions.

Sincerely,

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